

Geosci. Commun. Discuss., referee comment RC1
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Comment on gc-2021-39

Fabio Crameri (Referee)

Referee comment on "GC Insights: Rainbow colour maps remain widely used in the geosciences" by Richard M. Westaway, Geosci. Commun. Discuss., <https://doi.org/10.5194/gc-2021-39-RC1>, 2021

This is a solid, significant, and insightful study revealing and quantifying the widespread use of data-distorting and to many readers inaccessible colour combinations, like the rainbow colour map or the simple red and green combination. The author makes a good choice to focus on his findings, namely an extensive survey of papers published in geoscience journals rather than diving too deep into explaining details like the human perception of colour, uniformity of colour gradients, or available colour maps, which has been done already multiple times elsewhere. As such it is a concise and well-presented insight to any geoscientist and geoscience communicator and fits as a publication in Geoscience Communication. I only have minor comments to take care of by the author and suggest it for publication afterwards.

Line 77: Regarding point (i) on the increased awareness of the importance of scientific colour maps: Our recent perspective piece in Nature Communication on the topic (Crameri et al., 2020 - already in reference list - written by Geoscientists) is, now with >145k accesses, the most widely accessed paper of the journal published in the year 2020 (see <https://www.nature.com/collections/gegdbjhfbj/>). I guess that is a valid reference point to support this statement?

Lines 47-79: An important additional reason why there is less colour issues in recent years, might also be because there is more science-proof alternative colour maps available. The Scientific colour maps package (Crameri 2018) has, for example, in the last two years gained many more users, with currently >4.7k downloads, of which more than half (>2.6k) are for the latest version (7.0.0), which was released less than a year ago (on 2.2.2021) – See <http://doi.org/10.5281/zenodo.1243862> for details. Moreover, the Scientific colour maps package provides all colour map types and classes, which has not been the case before, meaning that e.g., scientific cyclic or categorical colour maps were either rare, not readily usable with common visualisation software, or simply non-existent, and hence simply not used.

Cramer, F. (2018). Scientific colour maps. Zenodo.
<http://doi.org/10.5281/zenodo.1243862>

Line 84: Maybe this paragraph could be introduced by the relevant finding of Moreland (2016), that the widespread use of rainbow is the main reason scientists propagate it further.

Moreland, K. Why we use bad color maps and what you can do about it. *Electron. Imaging* 2016, 1–6 (2016).

Lines 100-101: Just to back up the author in a previous discussion comment: The last sentence is a fair statement by the author, especially considering that adding visual errors to data of up to 7% and more (across the data range displayed; see Cramer 2017, GMD) is severely misleading (to both authors and readers). Colour misuse is not about personal preference or opinions, it is quantifiable and fact, in the same way statistical misuse is. So, if a reviewer or editor is supposed to ensure publications free of the latter, then this should clearly also apply to the misuse of colour. Until we researchers receive a solid education in scientific visualisation (i.e., one of the most widely used scientific methodologies), a thorough quality check by reviewers and editors is really the only way forward.

Fabio Cramer

17.11.2021